

preciable diminution in size as compared with the original sporangial frustule; and in this theory every requisite for the completion of the genetic cycle of the species would appear to be supplied.

II.—On *Physalia* and certain *Scombroïd* (?) Fish which are frequently associated with it in Tropical and Subtropical Seas. By G. C. WALLICH, M.D., F.L.S.

Mr. COLLINGWOOD'S interesting paper on "Oceanic forms of Hydrozoa," which appeared in the 'Annals' for November 1867, brought to my recollection some additional facts in connexion with *Physalia* which came under my observation during repeated voyages to and from India, and of which I retain copious notes. To these facts I will advert immediately; but I would point out, *en passant*, that the stinging-properties of this Hydrozoon are by no means so novel as Mr. Collingwood seems to think, every sailor with whom I have come in contact who has once traversed tropical and subtropical latitudes having been well aware that the "Portuguese man-of-war" is not a creature to be handled with impunity. The stinging-property resides in the tentacles, not in the polypites, and is produced by the discharge of acontia from minute oval sacs which are distributed at regular intervals along these organs.

Although I have invariably failed in my efforts to preserve the pneumatophore of *Physalia* in anything approaching to its pristine condition, I have been able readily to secure the tentacles in such a manner as to have retained their character up to the present period, namely, over a space of eleven years. This has been effected simply by placing the pneumatophore on a card or board (to which it adheres at once through a certain tenacity peculiar to it) and by then *winding off* the tentacle in the same way that one may wind off a skein of silk or cotton. The extensile quality of the organ is such that I have sometimes succeeded in stretching it, from its natural length of from 3 to 6 inches, to some 8 or 10 yards, and this without once breaking the continuity of the thread. On being so extended, the tentacle forms an extremely delicate flattened band, composed of several parallel fibres of highly contractile tissue arranged longitudinally, each fibre being from $\frac{1}{2500}$ to $\frac{1}{1700}$ of an inch in diameter*. On this, or, rather, imbedded *in* this composite filament, the acontia-sacs are distributed.

* A specimen of a piece of the preserved tentacle, mounted on an ordinary slide in Canada balsam, without further preparation, is to be seen in the cabinet presented by me to the Royal Microscopical Society.

But the most singular phenomenon connected with *Physalia* consists in its power of slowly and steadily depressing its pneumatophore from its normal erect position to a position which is horizontal, or, in other words, till the pneumatophore rests on one of its sides on the surface of the water. The act of elevation or depression occupies from eight to ten seconds or thereabout, and takes place as soon as the creature comes abreast of the bows of the ship, the state of depression continuing until it is abreast of the stern. I have so repeatedly witnessed this wonderful occurrence in moderately calm weather, at distances varying from a few feet to thirty or even fifty yards, that I should feel inclined to attribute it to some subtle influence produced either by molecular vibration in the water during the transit of the vessel, or to some equally subtle vibration communicated to the pneumatophore through the intervening atmosphere. The last, however, is, in all probability, the most rational way of accounting for it, inasmuch as the commencement of the depression takes place, in many instances, apparently quite beyond the reach of the surface-disturbance of the water, which causes a series of advancing waves ahead of the ship.

I would also take the opportunity of confirming what Mr. Collingwood says regarding the small fishes which he saw accompanying *Physalia*, having not only observed them over and over again, but captured them in some numbers in my casting-net thrown from the main-chains or the main-gangway port. Indeed, in a paper communicated by me, in December 1862, to 'The Intellectual Observer,' I distinctly drew attention to this fact, and mentioned that, having submitted some sketches of the fish to Dr. Günther of the British Museum*, he expressed his opinion that, if mature fish, and not young Scombridæ, they belong in all probability to some new and unknown genus. As these fish vary in size within very restricted limits only (I have never seen one longer than 4 or shorter than 3 inches †), Dr. Günther's suggestion as to their being new to science is doubtless correct.

As recorded by me, in the paper above referred to, these fish accompany *Physalia* just as the pilot-fish accompany the shark—in this instance swimming backwards and forwards and amongst the tentacles in such a fashion as to suggest a "co-operative" action between the two creatures, which results probably in a supply of food. I may add that, on many occasions, I have also detected, adherent or creeping amongst

* These sketches are now in the possession of the Microscopical Society.

† Mr. Collingwood speaks of having seen them 6 inches in length ('Annals' for November 1867).

the coiled masses of the tentacles and polypites of *Physalia*, isopod crustaceans from about half to three-quarters of an inch in length, of a similar species to some I also occasionally obtained adherent to the floats of *Ianthina*, or floating epiphytic Lepadidæ of the open ocean. It is further deserving of notice that both fishes and isopod crustaceans invariably presented the brilliant blue markings visible on the tentacles and polypite masses of *Physalia*—and, lastly, that, on placing specimens of *Physalia* on a piece of cardboard immediately after capture, I have seen a slow rolling movement of the pneumatophore continue to take place for upwards of an hour, and, indeed, until its wall had actually shrivelled with the heat. The slow and rolling nature of this action gave me the distinct impression, at the time, that it was due to vital (probably muscular) contractility, and not merely mechanical.

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III.—*Description of some new Species of Fossil Ferns from the Bournemouth Leaf-bed.* By A. WANKLYN, B.A., Sidney Sussex College, Cambridge.

[Plate I.]

IN the spring of 1867, Admiral Sullivan was kind enough to show me some specimens of ferns which he had obtained from the Bournemouth leaf-bed. Since then I have endeavoured to obtain sufficient data for the determination of these ferns. This I have done with regard to the ferns most commonly found, which I now propose to figure and describe.

I also figure two other ferns, which differ from these, but of which I have only been able to find the specimens from which the drawings are made.

Few patches of clay in this district are entirely without traces of leaves; their absence at any particular spot seems to be due, not so much to a scarcity of leaves when the strata were deposited as to the fact of the matrix having been unfavourable to their preservation.

The ferns, however, seem to be very local. I have only heard of their being found at one place in this district; and there they occur in great abundance. In the section exposed in 1867 there were two or three layers, each about an inch in thickness, which consisted of dicotyledonous leaves and fronds of ferns matted together. Beneath these there was usually a thin stratum of sand a few lines in thickness.

The state of preservation of the ferns varies with the nature of the deposit. Where the matrix is sandy, the carbonaceous matter has almost disappeared, and often only the cast of the